Module 12, for example, alone or with analysis software. A differential count could be determined from the data collected. These and other hematologic tests are more completely described in ~~applicant's co-pending applications _____ (Attorney Docket Number UFB-005, UFB-016)~~United States Patent application number 09/249,721 and United States Patent No. 5,948,686.

Example II: Chemical Analyses

Referring to FIGS. 1 and 4, a complete blood count requires that the RBC's be evaluated for hemoglobin content using a chemical analysis. The operator deposits the whole blood sample into the container reservoir 22 and gently shakes the container 18 to ensure uniform mixing of the sample and a colorant previously deposited in the reservoir 22, and inserts the container 18 into the Reader Module 12. The label reader 38 reads the container label 28 and transfers the information contained within the label 28 to the Programmable Analyzer 16. Similar to the process described above, the label--provided information identifies a plurality of analysis algorithms and a plurality of container features operable to enable the analysis of the biologic fluid sample. In this example, the container features include lysing and stabilizing reagents and their ~~position~~ spatial location within a chamber 20, the colorant deposited in the reservoir, and physical characteristics of the chamber 20 at known spatial locations. In a first embodiment, the container 18 includes a first chamber and a second chamber, both in fluid communication with the reservoir 22. The hemoglobin evaluation is performed in the first chamber and the remainder of the complete blood count tests are performed in the second chamber. In a second embodiment, all of the tests necessary for the complete blood count, including the hemoglobin evaluation, are done in a single chamber 20. The lysing reagent is used to break down RBC's within the sample and thereby release the hemoglobin stored within the RBC's. The stabilizer reagent is used to increase the reliability of the hemoglobin evaluation.

After the container 18 is loaded in the Reader Module 12, the Programmable Analyzer 16 directs the rod 90 to actuate the container valve 26 and thereby release the sample and

colorant mixture into the first chamber. At the same time the valve 26 is actuated, the analysis algorithm stored within the Programmable Analyzer 16 starts an internal timer, and the hemoglobin analysis is performed after one or more predetermined intervals of time. The analysis algorithm for the hemoglobin evaluation operates in a manner similar to that described above in the hematology example where the Programmable Analyzer 16 positions the appropriate SE or LSE filters 58,66 if any, within the path of the light beam 54 within the field illuminator 40, and light beam 54 selectively produced from the light source 44 and filtered within the field illuminator 40 is directed into the sample quiescently residing within the first chamber forming a field having an imaged area, etc. The light emitted from the colorant within the sample passes back through the field illuminator 40 and into the image dissector 42 where it is converted into an electronic format in real time, and the optical density of the hemoglobin in the first chamber is measured and the hemoglobin concentration is calculated. The remaining analyses associated with a complete blood count are performed in the second chamber.

In the second embodiment where all of the complete blood count analyses are performed in a single chamber 20, the portion of the biologic fluid sample used for the hemoglobin evaluation is contiguous with remaining portion of the fluid sample. The fluid sample portion devoted to the hemoglobin evaluation is preferably oriented toward one side of the chamber 20, however, to minimize potential mixing of the lysing agent with the remaining portion of the fluid sample. The coordinate addresses (i.e., spatial locations) of the hemoglobin evaluation reagents and the chamber region where the evaluation is best performed are communicated to the Programmable Analyzer 16 via the label 28. The chamber through-plane thickness 78 in the hemoglobin evaluation region is small enough such that vertical diffusion (and ultimate equilibrium) of the chemical reagents within the biologic fluid sample occurs at a much faster rate than lateral diffusion, thereby preventing the lateral diffusion of the reagent and possible interferences with the analyses to be performed.

Example III: Urinalysis

Referring to FIGS. 1 and 4, a complete urinalysis requires a chemical analysis and a particulate analysis of the urine sample. The operator places a urine sample within the reservoir 22 of the container 18 and the container 18 is installed within the Reader Module 12. The label reader 38 reads the container label 28 and ~~transfers~~ passes the information contained therein to the Programmable Analyzer 16. The information from the label 28 identifies a plurality of analysis algorithms and container features operable to enable the analysis of the biologic fluid sample, and like the hemoglobin example above, the analyses may be performed in a single chamber 20 or in a plurality of chambers. In this example, the label 28 provides information that the container features include colorant disposed in the container reservoir 22, one or more chemical reagents disposed at known spatial locations ~~particular coordinate addresses~~ within a chamber 20 to colorometrically relate information concerning the specific gravity, pH, glucose, and ketones within the urine sample after a given period of time, and physical characteristics of the chamber 20 at known spatial locations that enable detection, evaluation, and/or enumeration of particles within the urine sample. The physical characteristics of the chamber 20 may, for example, be similar to those described above for the evaluation of WBC's where a plurality of regions of different through-plane thickness 78 may be accessed iteratively to provide optimum results.

The Programmable Analyzer 16 directs the rod 90 within the Reader Module 12 to actuate the valve 26 within the container 18 and thereby release the sample and colorant mixture into the chamber(s) 20. The analysis algorithm stored within the Programmable Analyzer 16 starts an internal timer when the sample is released into the chamber(s) 20, and the chemical analysis is performed at some time thereafter. Using the analysis algorithm for urinalysis, the Programmable Analyzer 16 positions the appropriate SE or LSE filters 58,66, if any, within the path of the light beam 54 within the field illuminator 40, and the light beam 54 selectively produced from the light source 44 and filtered within the field illuminator 40 is directed into a sample field quiescently residing within the chamber 20. The light emitted from the colorant within the sample passes back through the field illuminator 40 and into the image